creating remarkable solutions
for a higher quality of life

TRAFFIC IMPACT STUDY

Central Missouri Professional Services, Inc.

Proposed Goodwill Store

Jefferson City, Missouri

GBA Project No. 13386

JANUARY 12, 2016

GBA

GBA
architects
engineers

January 12, 2016

Mr. Paul Samson, P.E.
Central Missouri Professional Services, Inc.
2500 E. McCarty Street
Jefferson City, MO 65101

SUBJECT: Traffic Impact Study
Proposed Goodwill Store - Jefferson City, Missouri

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Dear Mr. Samson,

George Butler Associates, Inc. (GBA) has completed the traffic impact analyses for the proposed Goodwill Store Development. The proposed Goodwill Store development is generally located south and west of the intersection of Missouri Boulevard with Stoneridge Parkway, along the south side of South Ten Mile Drive, in Jefferson City, Missouri. GBA previously completed traffic impact studies for the proposed Stoneridge Village development and the Arby's Restaurant adjacent to the proposed Goodwill Store site.

9801 Renner Boulevard
Lenexa, Kansas
66219-9745

913.492.0400
913.577.8200 fax

EXISTING CONDITIONS

Existing Traffic Volumes: Existing A.M. and P.M. peak period traffic volumes were recorded by Central Missouri Professional Services, Inc. (CMPS) on Wednesday December 2, and Thursday, December 3, 2015, at the intersections of Missouri Boulevard with Stoneridge Parkway and Stoneridge Parkway with South Ten Mile Drive on Thursday. The existing A.M. peak hour (8:00-9:00 a.m.) traffic volumes are shown on **Figure 1.** The existing P.M. peak hour (4:30-5:30 p.m.) traffic volumes are shown on **Figure 2**.

GBA Companies
Lenexa, KS
Kansas City, MO
O'Fallon, MO
St. Louis, MO
St. Joseph, MO
Omaha, NE
Rock Island, IL
Broomfield, CO

Existing Street System: Missouri Boulevard is a four-lane major arterial running in an east-west direction with a separate westbound left-turn lane and an eastbound channelized right-turn lane at the intersection with Stoneridge Parkway. Stoneridge Parkway is currently a four-lane, median-divided roadway with separate left-turn lanes provided into the existing Stoneridge Village development sites in addition to dual northbound left-turn lanes and a single northbound channelized right-turn lane at the intersection with Missouri Boulevard. The intersection of Missouri Boulevard with Stoneridge Parkway is currently operating under signalized control.

South Ten Mile Drive is a two-lane roadway that intersects Stoneridge Parkway approximately 200 feet, center to center, south of Missouri Boulevard and currently operates as a stop-controlled intersection, with stop control for eastbound vehicles on South Ten Mile Drive.

www.gbateam.com

Proposed Land Uses: The proposed Goodwill store development is shown on **Exhibit 1**. The site consists of a 14,561 square foot building with a drop-off canopy for donations.

Proposed Access Plan: The proposed development will be accessed via two driveway intersections with South Ten Mile Drive. Drive 1 will be located approximately 350' west, center to center, of the intersection with Stoneridge Parkway. Drive 2 will be located approximately 220' west, center to center, from Drive 1.

Trip Generation: The Goodwill Store is a unique trip generator, and no land use code provided in the *Institute of Traffic Engineers* (ITE) 9th Edition of the *"Trip Generation Handbook"* applies well to this type of land use. A previous traffic study for a Goodwill store in Arden Hills, Minnesota was completed by SRF Consulting Group in January 2014. As part of that study, traffic counts were conducted for similar Goodwill stores in Maple Grove and Hopkins, Minnesota (Twin Cities area). Rates from these counts were compared to similar ITE land use codes 815: Free Standing Discount Store, 826: Specialty Retail Center, 820: Shopping Center, and 875: Department Store and were provided to the City of Jefferson for consideration. It was mutually agreed upon by GBA and City staff to utilize the calculated avearge rates from the SRF study for the purposes of this study. **Table 1** shows the resulting trips generated for the P.M. peak hour for the proposed development. It should be noted that the retail store and drop-off hours for the Goodwill store during the weekdays begin at 9:00 a.m. Therefore, only the P.M. peak hour was analyzed for this traffic study. As shown on **Table 1**, 54 entering trips and 59 exiting trips would be expected for the site during the P.M. peak hour.

Trip Distribution: Trip distributions from the previous studies completed for the Stoneridge Village and Arby's developments were generally utilized for this study. Slight adjustments were made due to the minor change in existing traffic patterns at the intersection of Missouri Boulevard with Stoneridge Parkway. In general, the distributions used were as follows:

To/From West via Missouri Boulevard	50%
To/From East via Missouri Boulevard	40%
To/From South via Stoneridge Parkway	10%

Site Traffic: P.M. peak hour traffic volumes for the Goodwill Store development were estimated using the trip generation procedure discussed above and assigned to the adjacent street network using the above trip distribution. **Figure 3** depicts the existing plus site P.M. peak hour traffic volumes.

Planned Traffic: The traffic volumes for the un-built portions of the adjacent Stoneridge Village Development were also included in the analysis as planned traffic. **Figure 4** shows the existing plus site plus planned traffic volumes for the P.M. peak hour.

Future Traffic Volumes: Future 20-year projected background traffic volumes were utilized from the previously completed traffic impact studies for the Stoneridge Village development. It should be noted that in the future, as the Stoneridge Village development progresses, a connection from Stoneridge Parkway south to West Edgewood Drive is anticipated. Once that connection is established, the distributions of Stoneridge Village traffic would be expected to change and more planned traffic will utilize the connection to the south. To be conservative, no Goodwill Store site traffic was reassigned to the south. **Figure 5** shows the future plus site plus planned traffic volumes.

CAPACITY ANALYSES

A series of intersection capacity analyses were completed at the study intersections in order to determine the expected levels of service and lengths of delays and vehicle queues experienced by drivers. The study intersections were analyzed based upon the latest edition of the *Transportation Research Board's* (TRB) 2010 *"Highway Capacity Manual"* using Synchro (version 9) software.

A description of the level of service (LOS) criteria used in these analyses is provided on the attached **Exhibit A**.

Current traffic signal phasing and timing was obtained from MoDOT and utilized for the intersection of Missouri Boulevard with Stoneridge Parkway. The signal is currently operating in coordination along Missouri Boulevard. Therefore, the existing cycle length of 90 seconds for the P.M. peak hour was maintained in all analysis scenarios.

Existing Conditions: The results for the existing A.M. and P.M. peak hour levels of service are shown on **Figure 6** and **Figure 7**, respectively. Most movements at the study intersections currently operate at LOS "B" or better. The northbound left-turn and right-turn movements at the intersection of Missouri Boulevard with Stoneridge Parkway are currently operating at LOS "D" during both the A.M. and P.M. peak hours, with minimal queueing. The 95th-percentile queues for the northbound movements are approximately 85 feet for the northbound left-turn and 50 feet for the northbound right-turn during the P.M. peak hour. There is approximately 140 feet of storage provided for the northbound approach before blocking of South Ten Mile Drive occurs.

Existing + Site Conditions: **Figure 8** depicts the expected P.M. peak hour levels of service for the existing plus site traffic volume scenario. As shown on the figure, most movements at the study intersections would still be expected to operate at LOS "B" or better. Again, the northbound left-turn and right-turn movements at the intersection of Missouri Boulevard with Stoneridge Parkway would be expected to operate at LOS "D" with minimal queueing. The existing geometrics and traffic control at the study intersections would be sufficient to serve the addition of the Goodwill Store development traffic.

Existing + Site + Planned Conditions: The expected P.M. peak hour levels of service for this traffic volume scenario are shown on **Figure 9**. The complete un-built portion of the Stoneridge Village development was considered as planned traffic for this scenario. However, no south connection to West Edgewood Drive was assumed in order to determine how the interim roadway system would operate if full build-out was completed before a southern connection was made. Generally, most individual movements, as well as overall intersection levels of service, would be adequate to serve this condition without the connection. However, the northbound left-turn movement 95th-percentile queue at the intersection of Missouri Boulevard with Stoneridge Parkway would be expected to be approximately 235 feet, thus blocking the intersection with South Ten Mile Drive. This queue condition would only occur a couple of times during the P.M. peak hour. Again, it is anticipated that a southern connection to West Edgewood Drive would be made as the final phases of the Stoneridge Village development begins construction, which would alleviate the northbound approach demand during the critical P.M. peak hour.

Future + Site + Planned Conditions: **Figure 10** shows the expected P.M. peak hour levels of service for the future plus site plus planned traffic volume scenario, with the anticipated southern connection to West Edgewood Drive. Most movements at the study intersections would be expected operate at LOS "B" or better. The northbound left-turn and right-turn movements at the intersection of Missouri Boulevard with Stoneridge Parkway would be expected to operate at LOS "D". The 95th-percentile queue for northbound left-turn would be expected to be approximately 160 feet. This would extend just into the intersection with South Ten Mile Drive. Again, this queue would only occur a couple of times during the critical P.M. peak hour, and therefore, no additional geometric improvements would be recommended.

SUMMARY & RECOMMENDATIONS

The existing intersection geometry and traffic controls at the intersections of Missouri Boulevard with Stoneridge Parkway, and Stoneridge Parkway with South Ten Mile Drive would be expected to provide good levels of service with the addition of the Goodwill Store development traffic and the anticipated traffic from the continued build-out of the adjacent Stoneridge Village development.

If full development of the Stoneridge Village site occurs before a southern connection to West Edgewood Drive is made, the 95th-percentile queue for the northbound left-turn at the intersection of Missouri Boulevard with Stoneridge Parkway would be expected at times to back into the South Ten Mile intersection during the P.M. peak hour. However, this condition would only occur a couple of times during the P.M. peak hour. Therefore, no additional geometric improvements would be recommended.

We appreciate the opportunity to be of service to you on this very important project. Please feel free to contact us if you should have any questions or need additional information.

Respectfully submitted,

GEORGE BUTLER ASSOCIATES, INC.

Janelle Clayton, P.E., PTOE
Project Manager

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EXHIBIT A

Level of Service Definitions

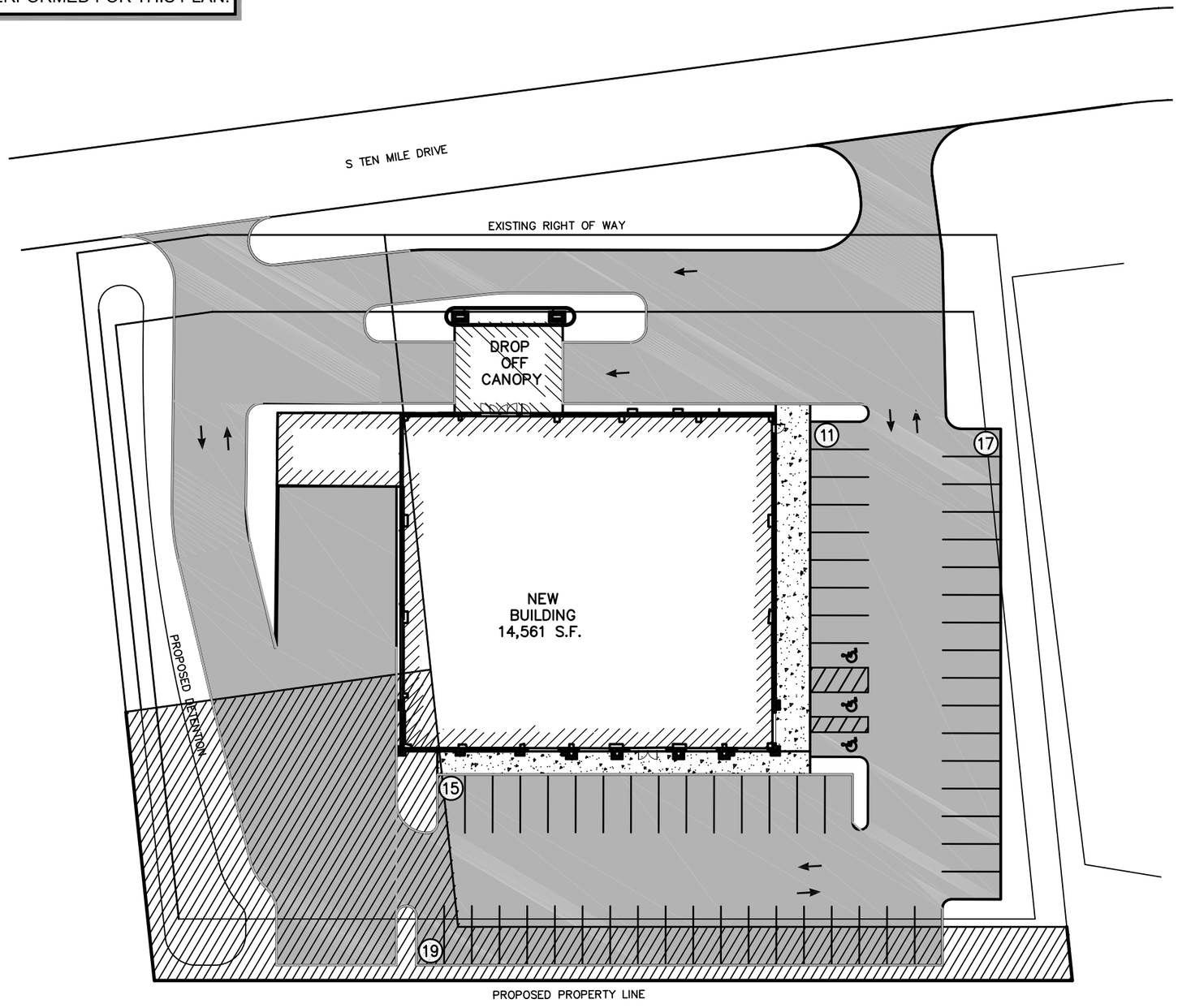
Level of service criteria are outlined in the 2010 edition of the *"Highway Capacity Manual"* (HCM) for both signalized and unsignalized intersections. The HCM defines the level of service as a measure of the quality of traffic flow. There are six different levels of service for each facility type, each representing a range of operating conditions. Each level of service is designated by a letter from "A" to "F", with "A" being the most desirable condition and "F" being the least desirable condition. The level of service criteria, as reported by the 2010 HCM, for both signalized and unsignalized intersections are listed below:

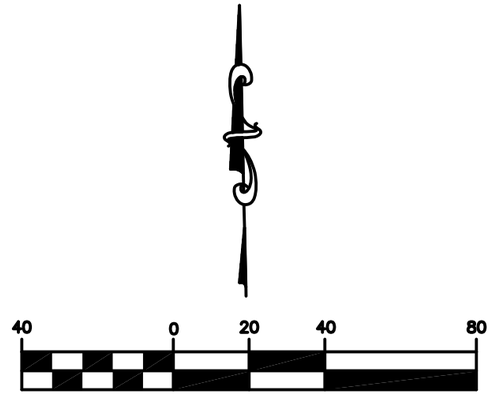
Unsignalized Intersections		**Signalized Intersections**	
Level of Service	**Average Control Delay (sec/veh)**	**Level of Service**	**Control Delay per Vehicle (sec)**
A	≤ 10	A	≤10
B	> 10 and ≤ 15	B	> 10 and ≤ 20
C	> 15 and ≤ 25	C	> 20 and ≤ 35
D	> 25 and ≤ 35	D	> 35 and ≤ 55
E	> 35 and ≤ 50	E	> 55 and ≤ 80
F	> 50	F	> 80

CONCEPT LAYOUT 2A

JEFFERSON CITY, MO

NOTE:
THIS IS A CONCEPT PLAN. NO BOUNDARY OR ALTA SURVEY HAS BEEN PERFORMED FOR THIS PLAN.





JULY, 2015

LEGEND

- EXISTING PAVEMENT
- NEW CONCRETE PAVEMENT
- NEW CONCRETE SIDEWALK/APPROACHES
- NEW BUILDING
- PROPOSED PROPERTY AQUISITION

EXISTING ZONING = C-1
PROPOSED ZONING = C-1

FRONT YARD: 25 FT.
SIDE YARD: 10 FT.
REAR YARD: 20 FT.
MAXIMUM HEIGHT REQUIREMENT IS 45'

PARKING CALCULATIONS:

PARKING SPACES REQUIRED –
1 PER 250 SF. OF GROSS
FLOOR AREA (14,561 sf/250) = 59

TOTAL SPACES PROVIDED – = 62

NOTE:
RESALE SHOP MAY REQUIRE A CONDITIONAL USE PERMIT TO BE ACQUIRED.

EXHIBIT 1

North Office
81 East Main Street
Wentzville, Missouri 63385
636-332-4574 (tel.)
636-327-7001 (fax)
www.wentzmail.com

COCHRAN
Civil Engineering
Land Surveying
Architecture
Site Development
Master Planning
General Consulting

JEFFERSON CITY GOODWILL

JEFFERSON CITY, MISSOURI

CONCEPT LAYOUT

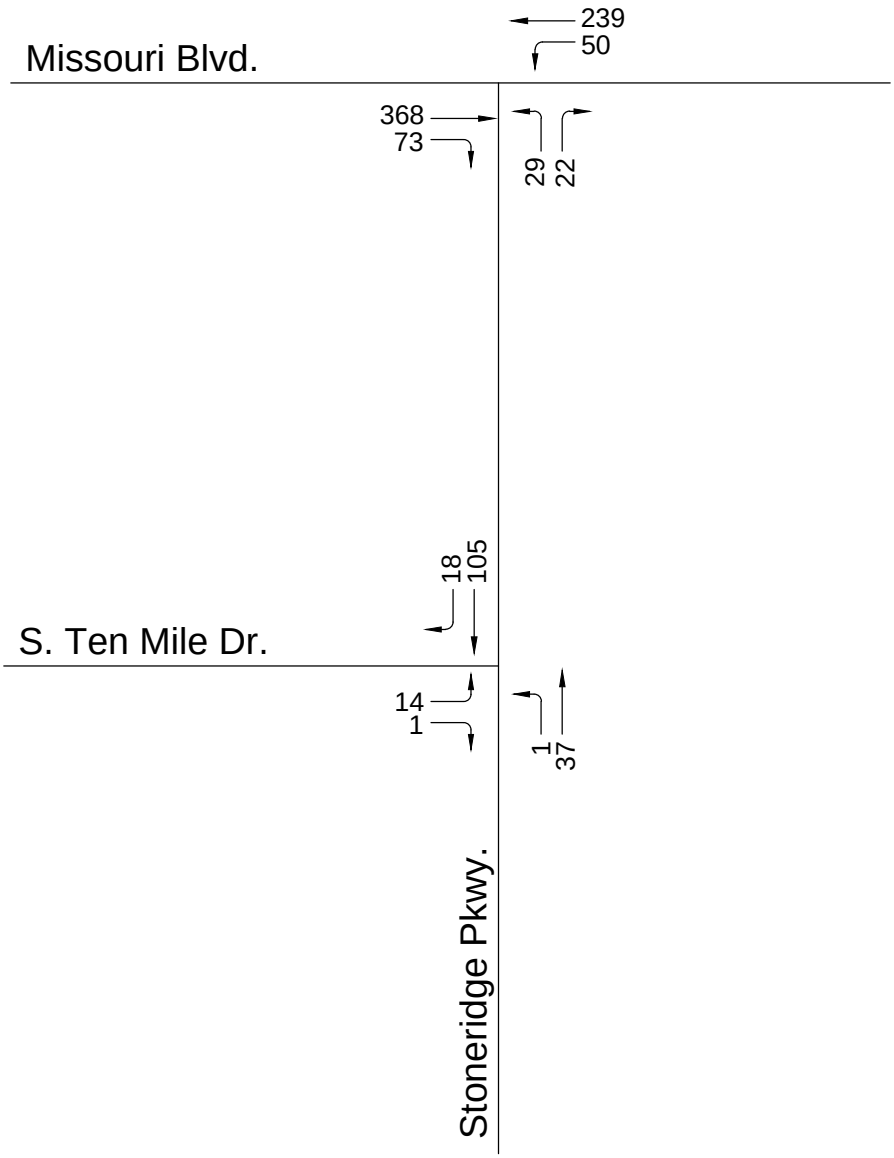
DATE:	REVISION:	DWN. BY:	APP'D. BY:

DWN. BY: RDH
APP'D. BY: ESK
DATE: 7-14-15
SCALE: 1" = 40'
PROJ. NO: M15-7155
DWG. NO: 2A

LEGEND

100 — Total Traffic Volume (vph)

Vehicle Movement



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DATE
12/31/2015

TRAFFIC VOLUMES
EXISTING CONDITIONS
A.M. PEAK HOUR

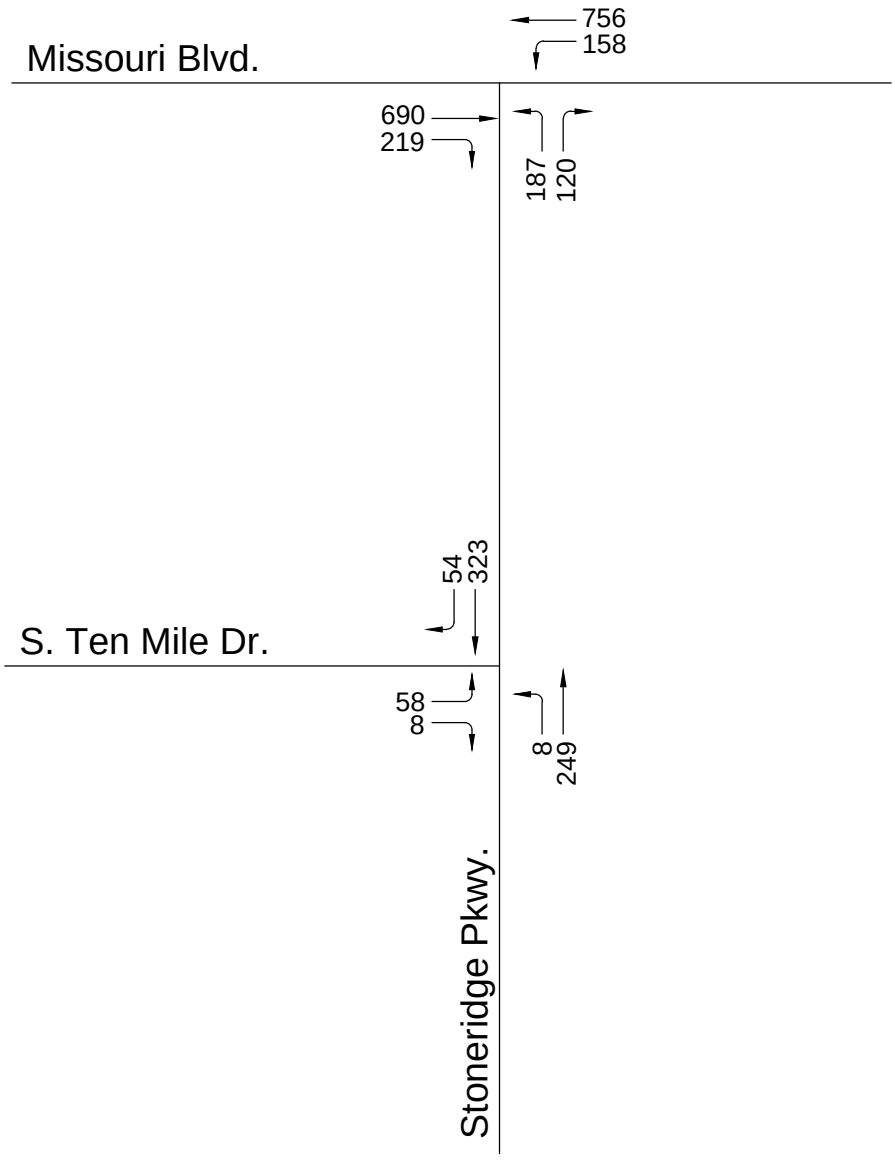
FIGURE 1

LEGEND

100

Total Traffic Volume (vph)

Vehicle Movement



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TRAFFIC VOLUMES
EXISTING CONDITIONS
P.M. PEAK HOUR

FIGURE 2

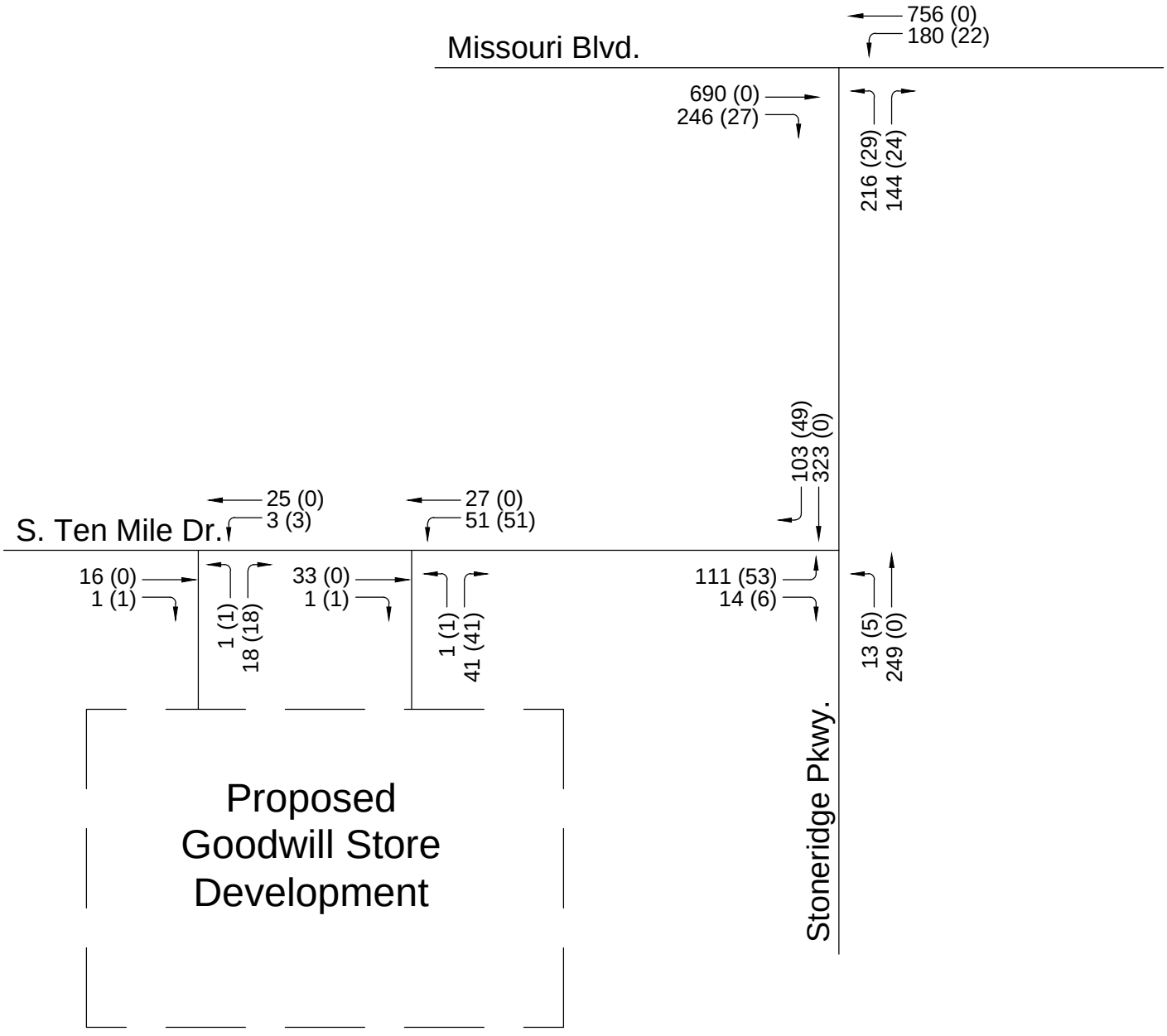
LEGEND

Site Generated Traffic Volume (vph)

100 (200)

Existing Traffic Volume (vph)

Vehicle Movement



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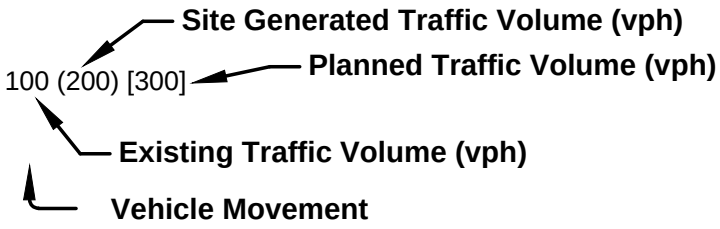
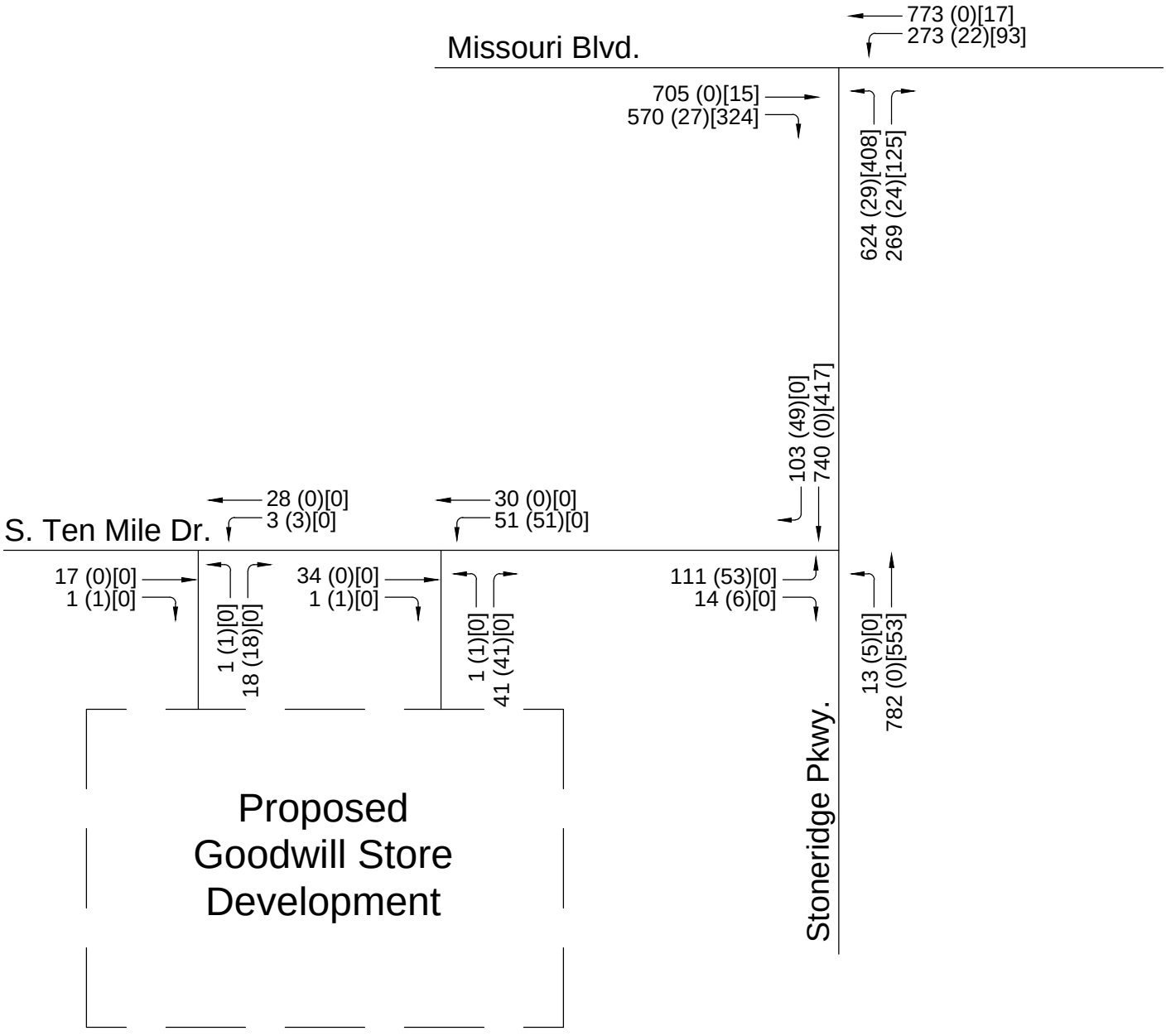
TRAFFIC VOLUMES
EXISTING + SITE
P.M. PEAK HOUR

FIGURE 3

LEGEND





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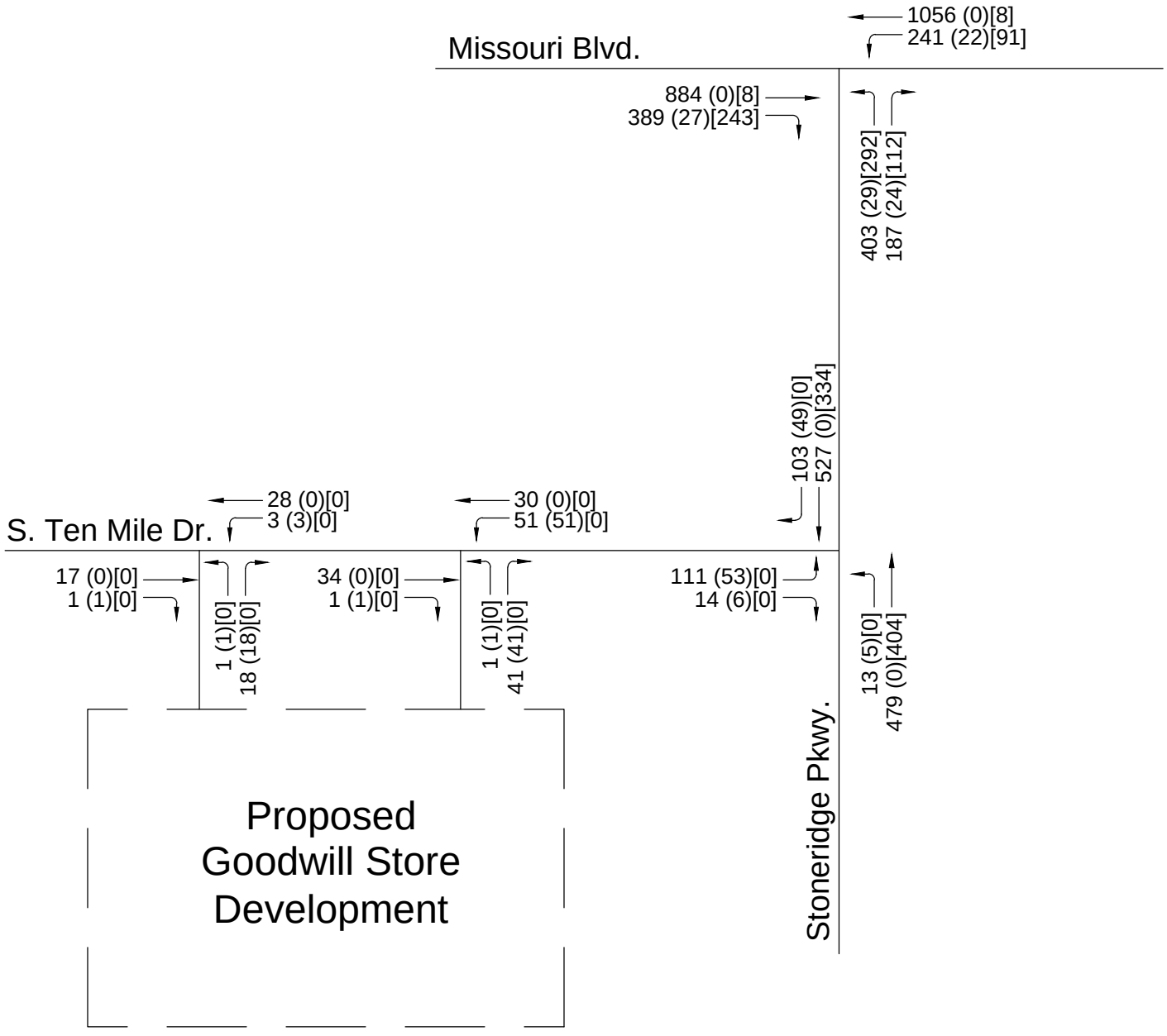
LEGEND

Site Generated Traffic Volume (vph)

100 (200) [300] — Planned Traffic Volume (vph)

Future Traffic Volume (vph)

Vehicle Movement



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LEGEND

Movement Level of Service

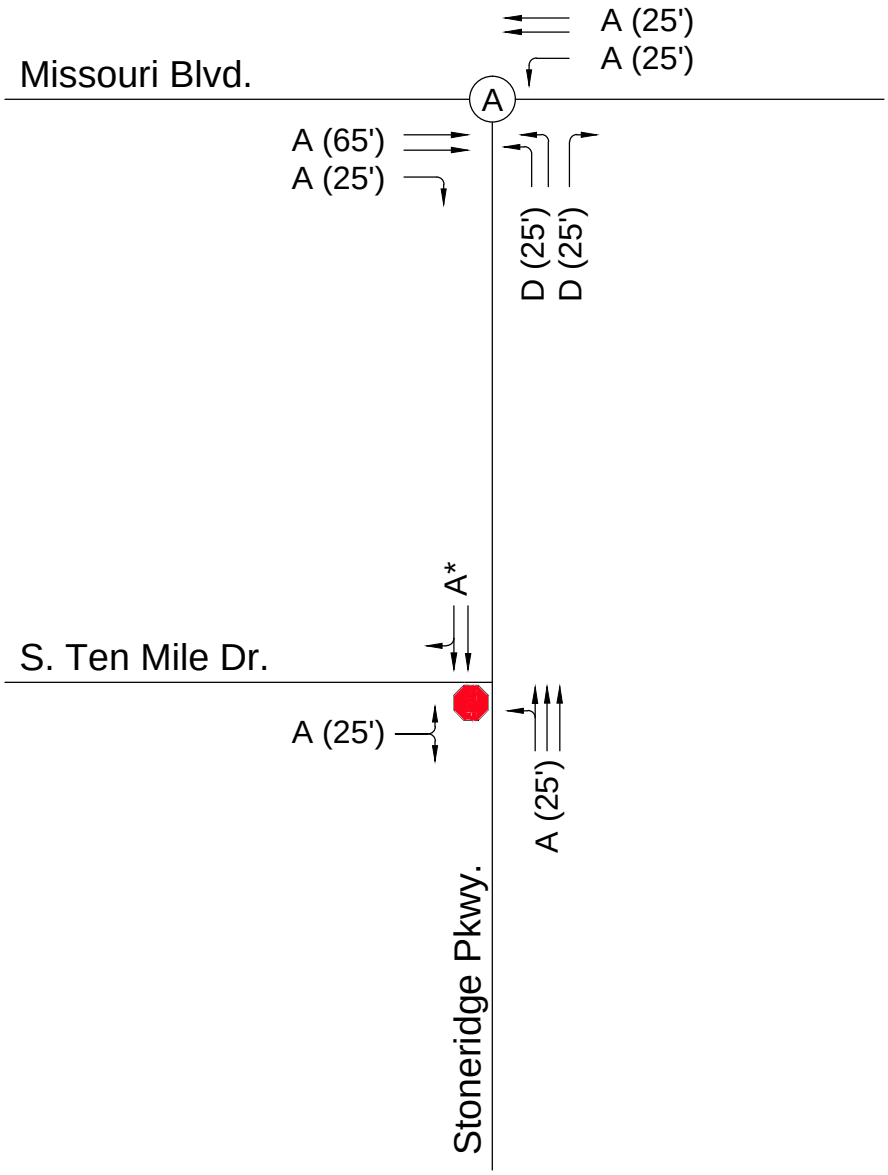
A (100')

A — **Synchro 95th Percentile Queue**

Ⓑ **Signalized Intersection Level of Service**

Stop Sign Control

A* **Capacity Per Demand**



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LEVELS OF SERVICE
EXISTING
A.M. PEAK HOUR

FIGURE 6

LEGEND

Movement Level of Service

A (100')

Synchro 95th Percentile Queue

A

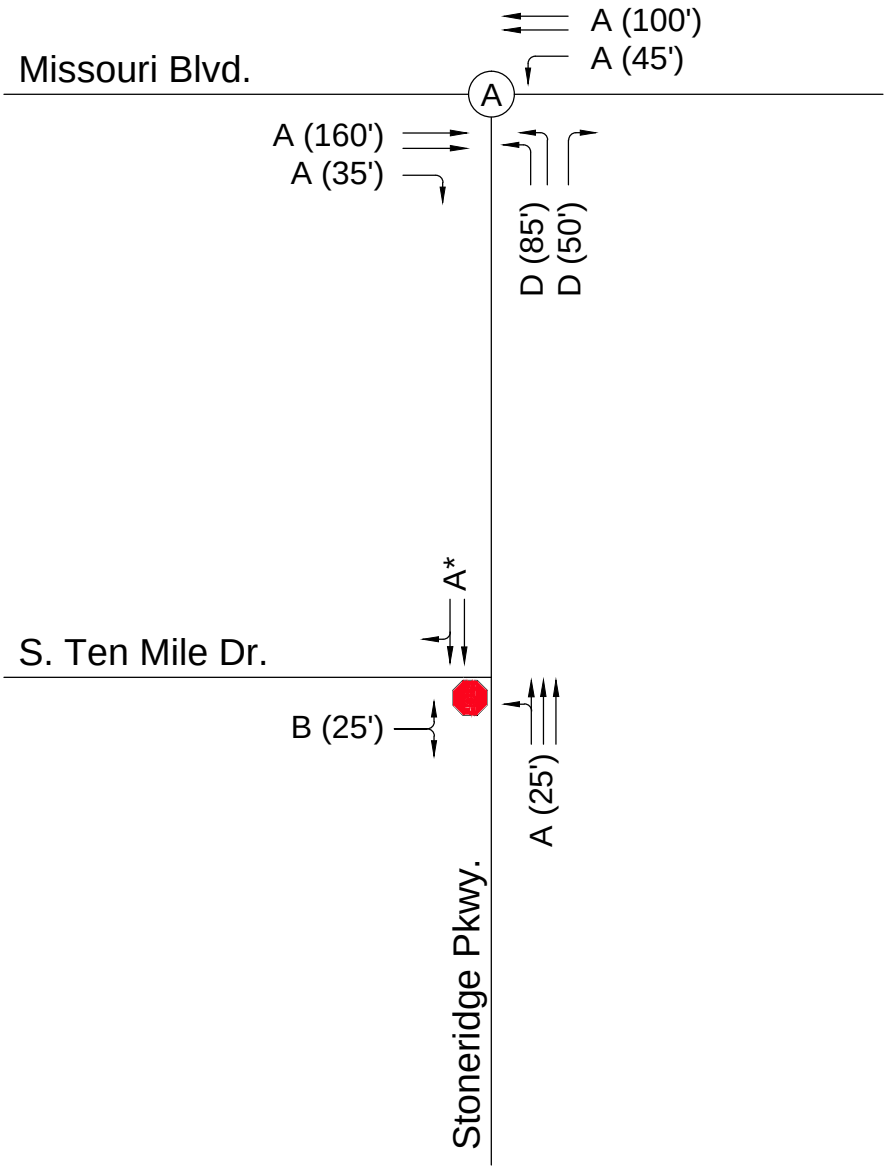
Signalized Intersection Level of Service

B

Stop Sign Control

Capacity Per Demand

A*



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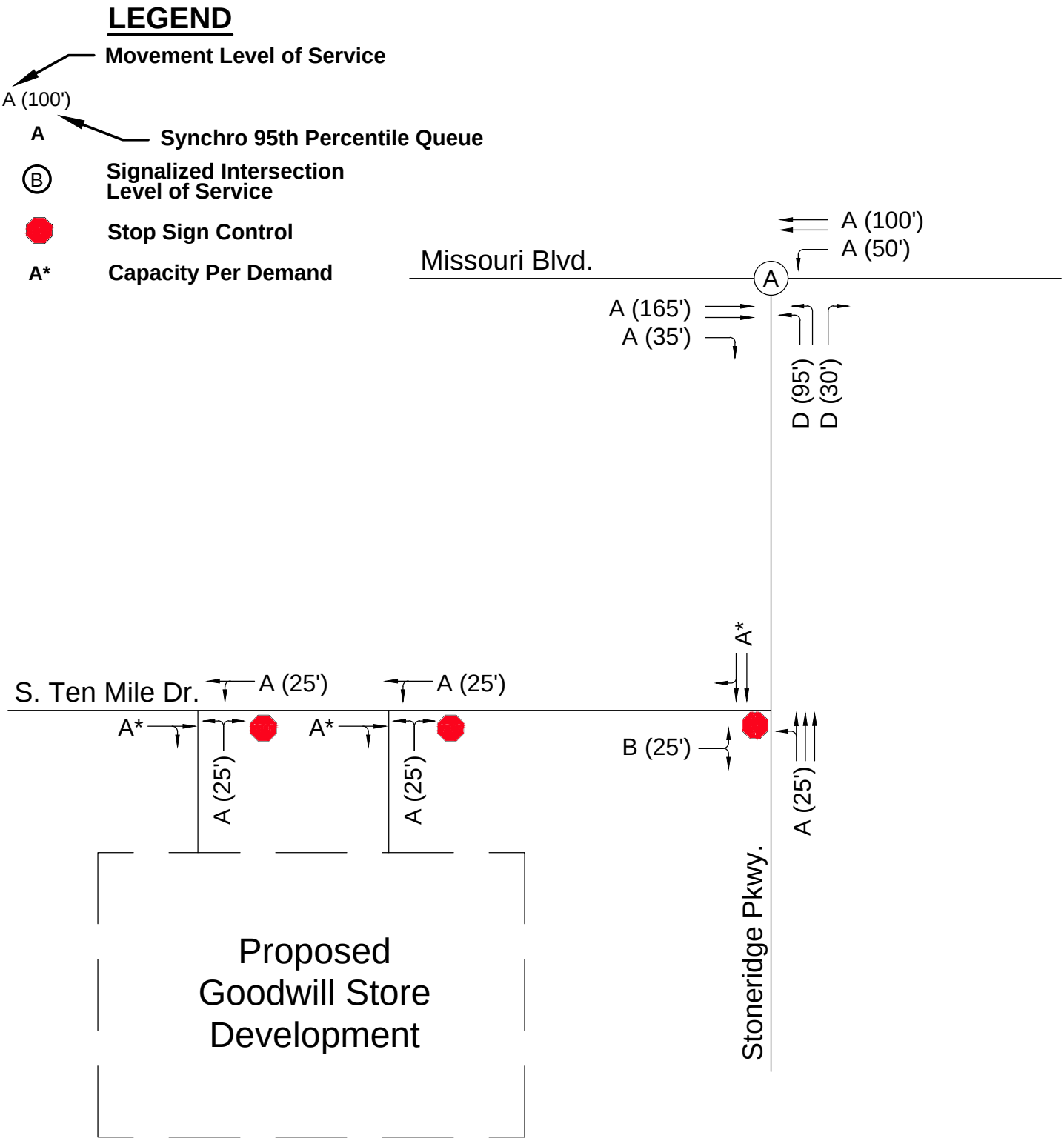
LEVELS OF SERVICE
EXISTING
P.M. PEAK HOUR

FIGURE 7



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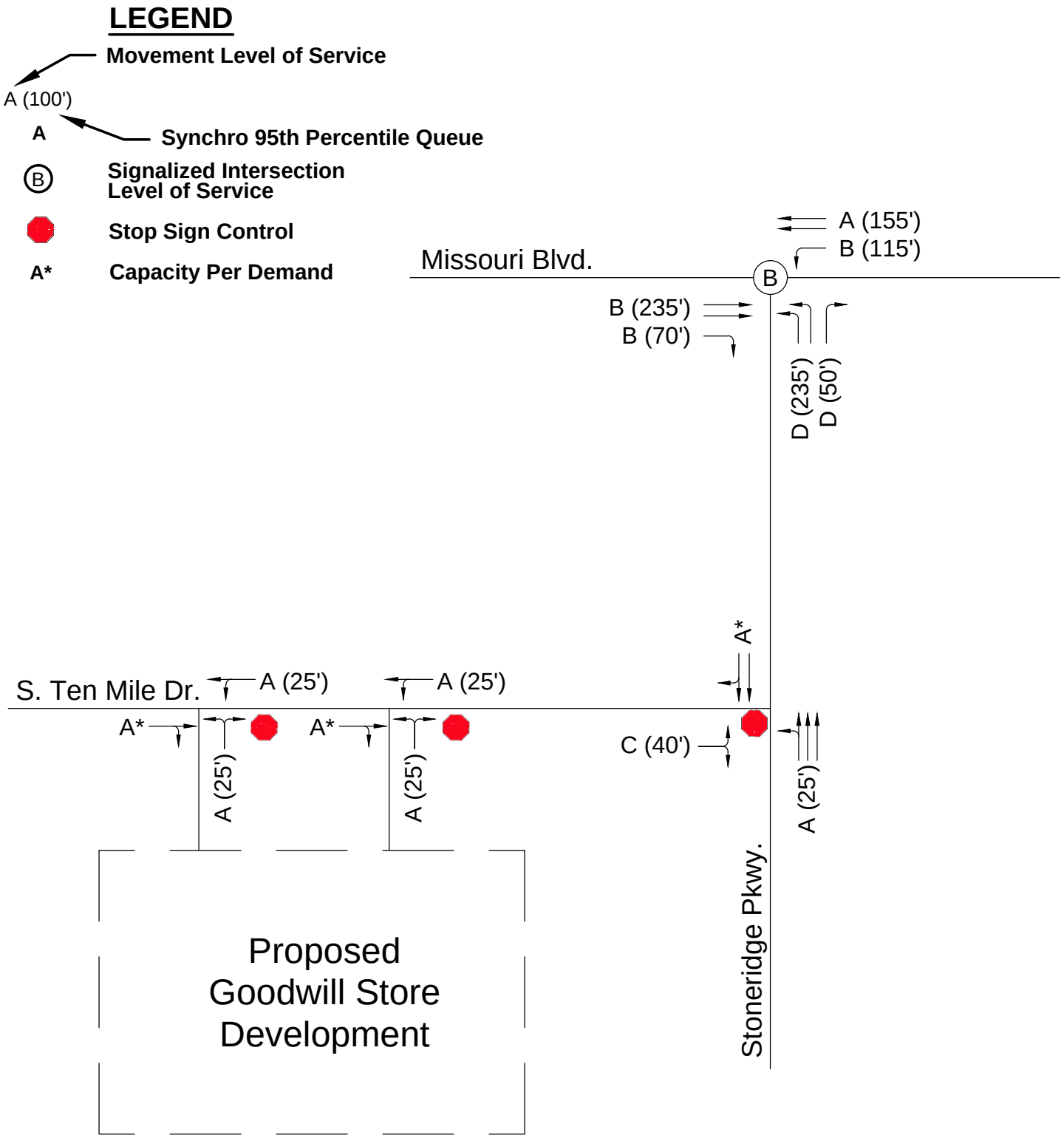
LEVELS OF SERVICE
EXISTING + SITE
P.M. PEAK HOUR

FIGURE 8



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DATE
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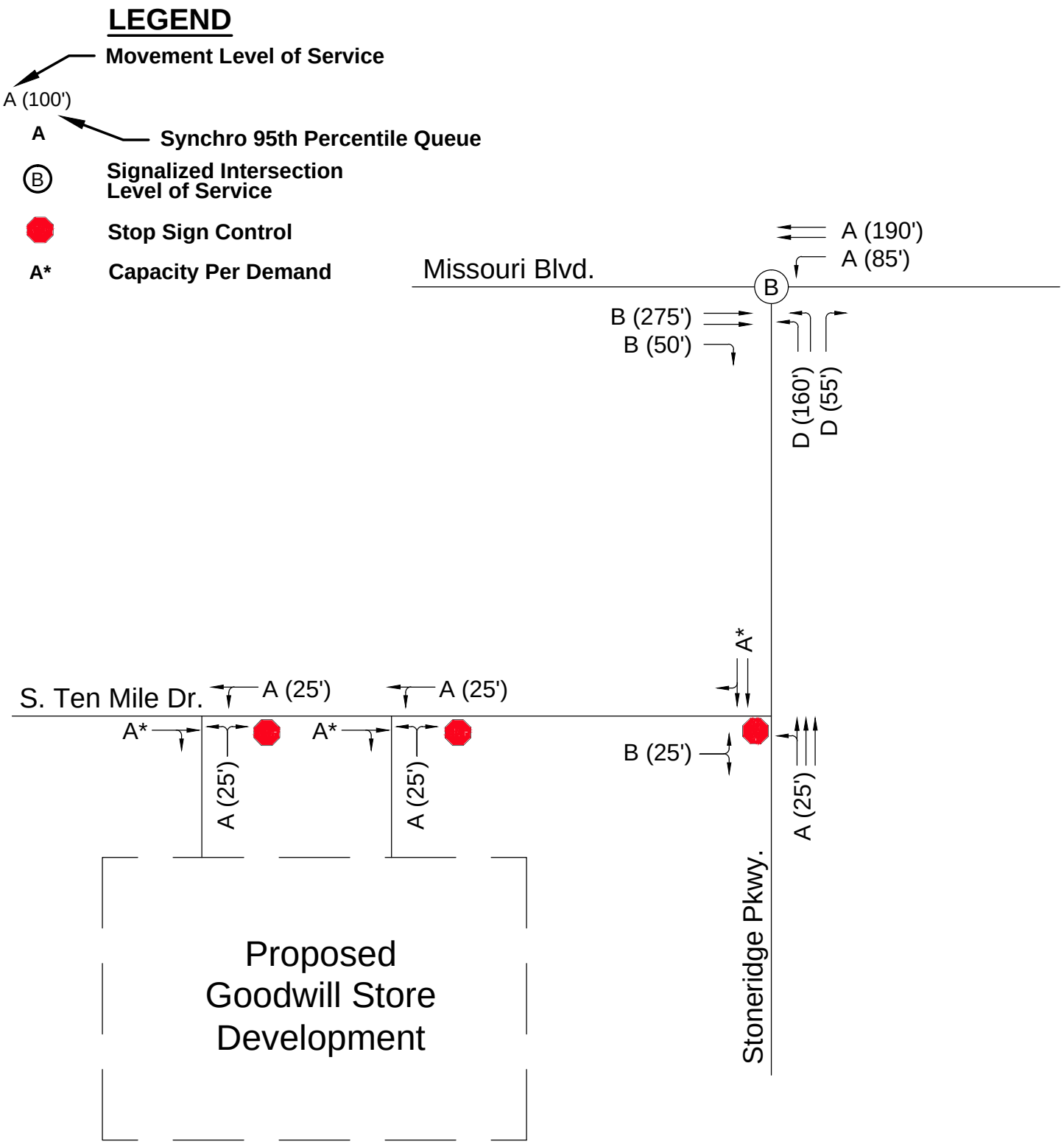
LEVELS OF SERVICE
EXISTING + SITE + PLANNED
P.M. PEAK HOUR

FIGURE 9



GBA architects engineers	N N.T.S.	PROJECT NUMBER 13386 DATE 12/31/2015	LEVELS OF SERVICE FUTURE + SITE + PLANNED P.M. PEAK HOUR	FIGURE 10